

Guide compiled
by Mr. Atkey

THE SIPRO PRE-PLE SET VI 2024

MATHEMATICS

Time Allowed: 2 Hours 30 Minutes

Index No.	Random No.	Personal No.

Candidate's Name: _____

Candidate's Signature: _____

School Random No: _____

District ID: _____

READ THE FOLLOWING INSTRUCTIONS CAREFULLY:

1. This paper has two sections: A and B.
2. Section A has 20 questions (40 Marks).
3. Section B has 12 questions (60 Marks).
4. Attempt all questions in both sections. All answers to both sections A and B must be written in the spaces provided.
5. All answers must be written in blue or black ball point pens or *ink*. Only diagrams and graph work must be done in *pencil*.
6. Unnecessary *alteration/crossing* of work will lead to loss of marks.
7. Any *handwriting* that cannot be easily read may lead to loss of marks.
8. Do not fill anything in the boxes indicated.

"FOR EXAMINER'S USE ONLY"

For Examiner's Use Only:

Qn No.	MARKS	INITIALS
1 - 5		
6 - 10		
11 - 15		
16 - 20		
21 - 22		
23 - 24		
25 - 26		
27 - 28		
29 - 30		
31 - 32		
Total		

Please turn over



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SECTION A: 40 MARKS

Attempt all questions in this section.
Questions 1 to 20 carry two marks each

1. Work out: 302

$$\begin{array}{r} \times 3 \\ \hline 906 \end{array}$$

2. Given that $W = \{1, 2, 3\}$, find the number of proper subsets in set W

$$n(C) = 2^n - 1$$

$$n(C) = 2^3 - 1$$

$$2 \times 2 \times 2 - 1$$

$$8 - 1$$

$$n(C) = 7$$

3. Find the range of -3, 6, 0, -7

$$R = H - L$$

$$6 - (-7)$$

$$6 + 7$$

$$13$$

4. Work out; $312_{\text{four}} + 33_{\text{four}}$

$$\begin{array}{r} \overset{0}{\cancel{1}} \overset{1}{\cancel{0}} \\ 312_{\text{four}} \\ + 33_{\text{four}} \\ \hline 1011_{\text{four}} \end{array} \quad \begin{array}{l} 5 \div 4 = 1 \text{ r } 1 \\ 4 \div 4 = 1 \text{ r } 0 \end{array}$$

5. On the clock face below, represent 0015 hours.



0015 hours \rightarrow 12:15am

6. $2e^\circ$ and $(3e-10)^\circ$ are complementary angles. Find the value of e .

$$2e^\circ + (3e-10)^\circ = 90^\circ \quad \uparrow \quad 5e - 10 + 10 = 90 + 10$$

$$2e + 3e - 10 = 90 \quad \frac{5e}{8} = \frac{100}{5}$$

$$5e - 10 = 90 \quad e = 20$$

7. Solve: $3 - 3h \geq 15$

$$3 - 3h \geq 15 \quad h \leq -4$$

$$3 - 3 - 3h \geq 15 - 3$$

$$-3h \geq 12$$

$$\frac{-3h}{-3} \leq \frac{12}{-3}$$

8. The prime factors of P and Q are $F_p = \{2, 3, 3_2\}$ and $F_q = \{3, 5, 7\}$. If the G.C.F is 6, find the value of n.

$$\text{Product of } P \cap Q = Q \text{ or}$$

$$n \times 3 = 6$$

$$\frac{3n}{3} = \frac{6^2}{3}$$

$$n = 2$$

9. Work out: $(5 \times \frac{1}{12}) - (2 \times \frac{1}{12})$

$$\frac{1}{12} (5-2) \quad \text{or} \quad \frac{5}{12} - \frac{2}{12} = \frac{3}{12}$$

$$\frac{1}{12} \times \frac{3}{4} = \frac{1}{4}$$

10. A hawker bought a belt at sh. 25,000. At what price should he sell if he intends to make a profit of sh. 3,000?

$$S.P = B.P + P$$

$$\begin{aligned} & \text{sh. } 25,000 \\ & + \text{sh. } 3,000 \\ \hline & \underline{\text{sh. } 28,000} \end{aligned}$$



11. Work out; $2 - 5 = \underline{\hspace{2cm}}$ (finite 6)

$$2 - 5 = - \text{(finite 6)}$$

$$2 + 6 - 5 = + \text{(finite 6)}$$

$$8 - 5 = 3 \text{ (finite 6)}$$

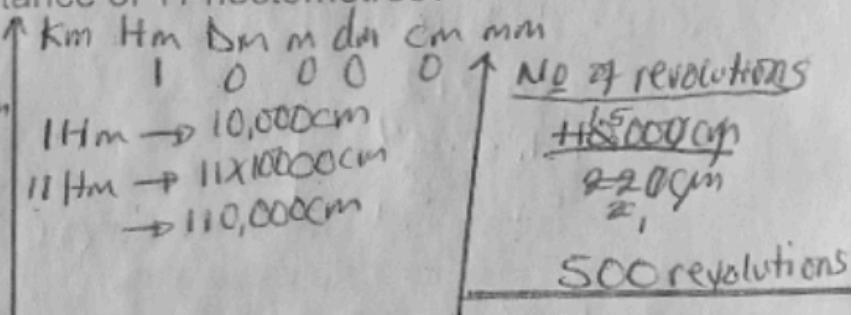
$$2 - 5 = 3 \text{ (finite 6)}$$

12. Obote had a tyre of radius 35cm. How many revolutions will it make to cover a distance of 11 hectometres?

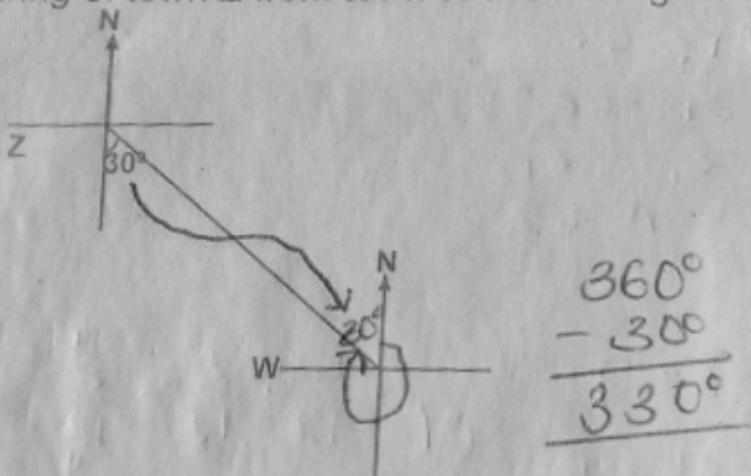
$$C = 2\pi r$$

$$C = 2 \times \frac{22}{7} \times \frac{5}{2} \times 35 \text{ cm}$$

$$C = 220 \text{ cm}$$



13. Find the bearing of town Z from town W in the diagram below.

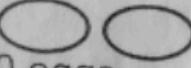


14. Increase 180 goats in the ratio of $3 : 1$

$$\left(\frac{3}{4} \div \frac{1}{2}\right) \times 180 \text{ goats} \quad \begin{matrix} 4 \\ 2 \end{matrix}$$

$$\frac{3}{4} \times \frac{1}{2} \times 180 \text{ goats}$$

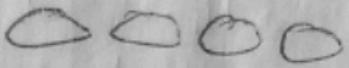
$$270 \text{ goats}$$

15. Given that  represent 30 eggs. Draw pictures to represent 60 eggs.

$$2 \text{ pics} \rightarrow 30 \text{ eggs}$$

$$1 \text{ pic} \rightarrow \frac{30}{2} = 15 \text{ eggs}$$

$$\rightarrow 15 \text{ eggs}$$



No of pictures

$$\frac{60}{15} = 4 \text{ pics}$$

16. If $e = -4$, $n = -5$ and $y = 3n$. Work out the value of $(e - y)n$.

$$(e-y)n$$

$$(-4-3n)n$$

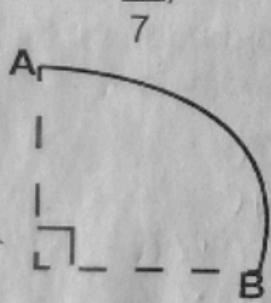
$$(-4-3 \times -5)^{-4}$$

$$(-4+15)^{-4}$$

$$11 \times -4$$

$$-44$$

17. The length of the arc **AB** in the figure below is 66cm. Find its radius.
(take π as 22)



$$\frac{1}{4} \times 2\pi r = c$$

$$\frac{1}{4} \times 2 \times \frac{22}{7} r = 66 \text{ cm}$$

$$\frac{1}{7} \times \frac{44}{7} r = 66 \text{ cm} \times 7$$

$$\frac{44}{49} r = 66 \text{ cm} \times 7$$

$$r = \frac{66 \times 7}{44} \text{ cm}$$

$$r = 42 \text{ cm}$$

18. Solve for b ; $2^{3b} \div 2^b = 64$

$$2^{3b} \div 2^b = 2^6$$

$$2^{3b-b} = 2^6$$

$$2^{2b} = 2^6$$

$$2b = 6$$

$$b = 3$$

2	64
2	32
2	16
2	8
2	4
2	2
1	1



19. A motorist travelling at a speed of 120km/h took 40 minutes to travel from town K to town M. Work out the distance between the two towns.

$$60 \text{ min} \rightarrow 1 \text{ h.}$$

$$40 \text{ min} \rightarrow \frac{40}{60} \text{ h}$$

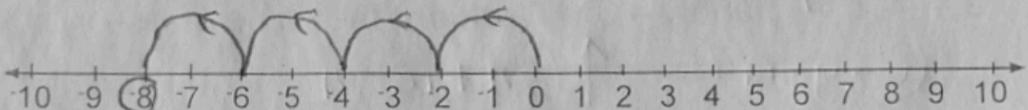
$$D = S \times T$$

$$D = \frac{120 \text{ km}}{1 \text{ h}} \times \frac{40}{60} \text{ h}$$

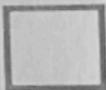
$$D = 80 \text{ km}$$

20. Use the number line below to work out 4×-2 .

4 groups of -2



$$4 \times -2 = -8$$



SECTION B: 60 MARKS

Attempt all questions in this section.

Marks for each part of the question are indicated in the brackets.

- 21.(a) Find the number that has been expanded below;

$$(3 \times 10^2) + (4 \times 10^1) + (6 \times 10^{-2}) \quad (02 \text{ marks})$$

$$3 \times 10 \times 10 + 4 \times 10 + 6 \times \frac{1}{10 \times 10}$$

$$300 + 40 + \frac{6}{100}$$

$$300 + 40 + 0.06$$

$$\begin{array}{r} 300 \\ + 40 \\ + 0.06 \\ \hline 340.06 \end{array}$$

- (b) Write 1095 in scientific notation.

(02 marks)

$$1095 \div 10 = 109.5$$

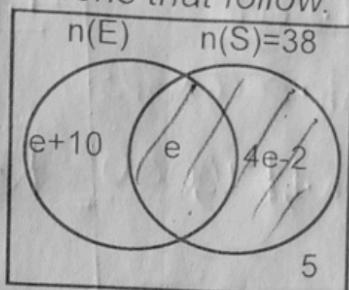
$$109.5 \div 10 = 10.95$$

$$10.95 \div 10 = 1.095$$

$$1095 \rightarrow 1.095 \times 10^3$$

1

22. The Venn diagram below shows the number of pupils who like English (E) and Science (S) in primary six class. Study it carefully and answer the questions that follow.



- (a) Find the value of e .

(02 marks)

$$e + 4e - 2 = 38$$

$$5e - 2 = 38$$

$$5e - 2 + 2 = 38 + 2$$

$$\frac{5e}{5} = \frac{40}{5}$$

$$\cancel{e} = 8$$

- (b) How many pupils like only one subject?

(02 marks)

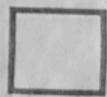
$$n(E) \text{ only} + n(S) \text{ only} \uparrow 18 + 30$$

$$(e+10) + (4e-2)$$

$$(18+10) + (4 \times 8 - 2)$$

$$18 + (32 - 2)$$

$$\underline{\underline{48 \text{ pupils}}}$$



23. Below is the exchange rate of a certain Forex Bureau.

1 Kenya shilling = Ug sh 30

1 US dollar = Ug sh 3600

1 British Pound Sterling = Ug sh 4700

- (a) Express the Uganda shillings 1,410,000 to British Pound Sterling.

(02 marks)

$$\text{Ugsh. } 4700 \longleftrightarrow 1 \text{ pound}$$

$$\text{Ugsh. } 1,410,000 \longleftrightarrow \left(\frac{1,410,000}{4700} \right) \text{ pounds}$$

$$\begin{array}{r} 1,410,000 \\ \times \frac{1}{4700} \\ \hline 300 \end{array}$$

300 pounds

$$\begin{array}{r}
 325 \\
 36 \\
 \hline
 1950 \\
 1780 \\
 \hline
 175
 \end{array}$$

b) Jane bought a motorcycle at 325 dollars. Find the cost of the motorcycle in Kenya shillings.

$$\begin{aligned}
 1 \text{ dollar} &\rightarrow \text{Ugsh. } 3600 \\
 325 \text{ dollars} &\rightarrow \text{Ugsh. } 3600 \times 325 \\
 &\rightarrow \text{Ugsh. } 1,170,000
 \end{aligned}$$

$$\begin{array}{r}
 \text{Cost in K.sh.} \quad (03 \text{ marks}) \\
 \hline
 39000 \\
 + 170,000 \\
 \hline
 179,000 \\
 \hline
 \text{K.sh. } 179,000
 \end{array}$$

$$\begin{array}{r}
 325 \\
 \times 36 \\
 \hline
 1950 \\
 975 \\
 \hline
 11700
 \end{array}$$

24. A primary six pupil was given cards with digits 5, 3, 0 and 4 to form four digit numerals;

(a) Write the smallest and biggest numerals formed:

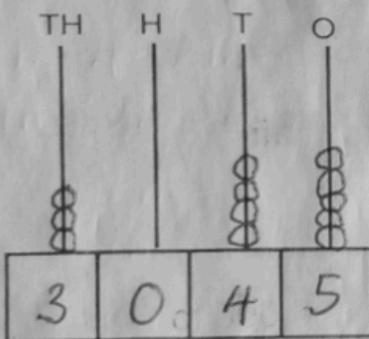
(i) smallest numeral (01 mark)

3045

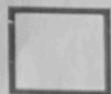
(i) biggest numeral (01 mark)

5430

(b) Represent the smallest numeral on the abacus below. (02 marks)



3045



25. The exterior and interior angles of a regular polygon are in the ratio of 2: 3 respectively.

(a) Name the polygon.

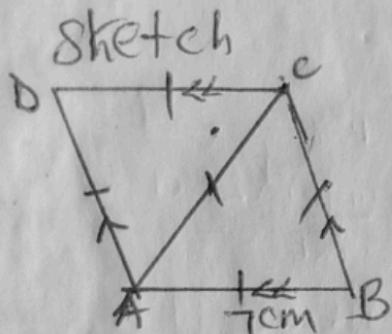
$$\begin{aligned}
 \text{Total parts: } 2+3 &= 5 \text{ parts} \\
 5 \text{ parts} &\rightarrow 180^\circ \\
 1 \text{ part} &\rightarrow \frac{180^\circ}{5} = 36^\circ \\
 &\rightarrow 36^\circ
 \end{aligned}$$

$$\begin{array}{l}
 2 \text{ parts} \rightarrow 36^\circ \times 2 = 72^\circ \\
 \text{Ext} \angle = 72^\circ
 \end{array}$$

$$\begin{array}{r}
 \text{No. of sides} \quad (03 \text{ marks}) \\
 \hline
 360^\circ \\
 \hline
 72^\circ \\
 2 \\
 \hline
 5 \text{ sides} \\
 \text{Pentagon}
 \end{array}$$



- 27.(a) Using a ruler, a pencil, and a pair of compasses only, construct a rhombus ABCD such that triangle ABC is an equilateral triangle of side 7cm. (05 marks)



- (b) Measure diagonal AC. (01 mark)

28. Solve for m:

(a) $4(m-1) - 2(m+3) = 0$

$$4(m-1) - 2(m+3) = 0$$

$$4m - 4 - 2m - 6 = 0$$

$$4m - 2m - 4 - 6 = 0$$

$$2m - 10 = 0$$

$$2m - 10 + 10 = 0 + 10$$

$$\begin{aligned} 2m &= 10 \\ \frac{2m}{2} &= \frac{10}{2} \\ m &= 5 \end{aligned}$$

(03 marks)

- (b) Kasozi is 58 years old and Magezi is 14 years old. In how many years' time will Kasozi be thrice as old as Magezi? (03 marks)

Let 'P' rep the years.

Kosso	Now	In 'P' yrs
Kasozi	58	58+P
Magezi	14	14+P

$$3(14+P) = 58+P$$

$$42 + 3P = 58 + P$$

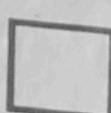
$$42 - 42 + 8P = 58 - 42 + P$$

$$3P = 16 + P$$

$$3P - P = 16 + P - P$$

$$\frac{2P}{2} = \frac{16}{2}$$

$$P = 8 \text{ years.}$$



29. Macula used 0.25 of her money to buy a loaf of bread, $\frac{1}{2}$ of the remainder for tea leaves and sugar and saves the rest.

(a) Find the fraction spent on savings.

$$\text{Bread: } \frac{25}{100} = \frac{1}{4}$$

$$\text{Remainder: } 1 - \frac{1}{4} = \frac{4-1}{4} = \frac{3}{4}$$

Tea leaves and Sugar

$$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$

Total fraction

$$\frac{1}{4} + \frac{3}{8} = \frac{2+3}{8} = \frac{5}{8}$$

(03 marks)

$\frac{5}{8}$

Savings

$$1 - \frac{5}{8} = \frac{8-5}{8} = \frac{3}{8}$$

(b) If she saved sh.3,600, find the amount of money she spent on a loaf of bread.

Total amount

$$\text{sh. } 3,600 \div \frac{3}{8}$$

$$\text{sh. } 3,600 \times \frac{8}{3}$$

$$\text{sh. } 9,600$$

Loaf of bread

$$\frac{1}{4} \times \text{sh. } 9,600$$

$$\text{sh. } 2,400$$

(03 marks)

30. The median of 4 consecutive even numbers is 13;

(a) Find the numbers.

Let 'm' rep. the 1st no

1st	2nd	3rd	4th
m	$m+2$	$m+4$	$m+6$

$$\frac{m+2+m+4}{2} = 13$$

$$\frac{m+m+2+m+4}{2} = 13 \quad (03 \text{ marks})$$

$$2x \frac{2m+6}{2} = 13 \times 2$$

$$2m+6 = 26$$

$$2m+6-6 = 26-6$$

$$2m = 20$$

$$m = \frac{20}{2} = 10$$

$$m = 10$$

$$2^{\text{nd}} \text{ no: } 10+2=12$$

$$3^{\text{rd}} \text{ no: } 10+4=14$$

$$4^{\text{th}} \text{ no: } 10+6=$$

$$10, 12, 14, 16$$

(b) Work out the sum of the smallest and largest numbers.

$$\begin{array}{r} \text{Sum: } 16 \\ \quad + 10 \\ \hline \quad 26 \end{array}$$

(02 marks)



31. A cyclist travelled at a speed of 80km/h covering a certain distance from town W to town Y taking 3 hours. It rested at town Y for half an hour before continuing to town Z a distance of 100km at a speed of 40km/h.

(a) How far is town Y from town W?

(02 marks)

$$D = S \times T$$

$$D = \frac{80 \text{ km}}{1 \text{ h}} \times 3 \text{ h}$$

$$D = 240 \text{ km}$$

(b) Calculate the cyclist's average speed for the whole journey.

From Y to Z

$$T = D \div S$$

$$T = 100 \text{ km} \div \frac{40 \text{ km}}{1 \text{ h}}$$

$$T = \frac{8 \frac{1}{2} \text{ h}}{40 \text{ km}} \times \frac{1 \text{ h}}{\frac{1}{2} \text{ km}}$$

$$T = 2 \frac{1}{2} \text{ h}$$

$$A.S = \frac{240 \text{ km} + 100 \text{ km}}{3 \text{ h} + \frac{1}{2} \text{ h} + 2 \frac{1}{2} \text{ h}} \quad (03 \text{ marks})$$

$$A.S = \frac{340 \text{ km}}{\frac{6}{2} \text{ h}} = 56 \frac{2}{3} \text{ km/h}$$

$$A.S = 56 \frac{2}{3} \text{ km/h}$$

32. Given that $y = 2x + 3$. Complete the table below.

(05 marks)

X	0	1	-2	-3	3
Y	3	5	-1	-3	9

$$y = 2x + 3$$

$$2x + 3 = 5$$

$$y = 2x + 3$$

$$2x + 3 = -3$$

$$y = 2x$$

$$y = 2x + 3$$

$$2x + 3 - 3 = 5 - 3$$

$$y = 2x - 2 + 3$$

$$2x + 3 - 3 = -3 - 3$$

$$y = 2x$$

$$y = 0 + 3$$

$$\frac{2x}{2} = \frac{2}{2}$$

$$y = -4 + 3$$

$$2y = -6 + 3$$

$$y = 6 + 3$$

$$y = 3$$

$$x = 1$$

$$y = -1$$

$$y = -3$$



(b) How many triangles has the polygon?

(02 marks)

$$\text{No of triangles} = n - 2$$

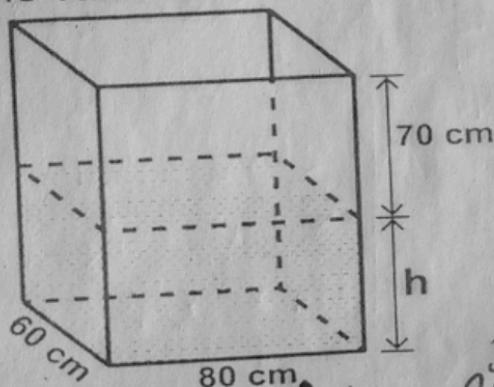
$$5 - 2$$

3 triangles

26. The tank below has 240 litres of water in it. Study it carefully and use it to answer the questions that follow.

(02 marks)

(a) Find the value of h .



$$V = c \times 1000 \text{ cm}^3$$

$$V = 240 \text{ L} \times 1000 \text{ cm}^3$$

$$V = 240,000 \text{ cm}^3$$

$$h = \frac{V}{L \times W}$$

$$h = \frac{30 \times 50}{80 \text{ cm} \times 60 \text{ cm}}$$
$$h = 50 \text{ cm}$$

(b) How many litres of water should be added to fill the tank?

(03 marks)

$$c = \left(\frac{N}{1000 \text{ cm}^3} \right) \text{ litres}$$

$$c = \left(\frac{80 \text{ cm} \times 60 \text{ cm} \times 70 \text{ cm}}{1000 \text{ cm}^3 \times \text{cm} \times \text{cm}} \right) \text{ litres}$$

$$\begin{array}{r} 32 \\ \times 7 \\ \hline 224 \end{array}$$

$$c = 224 \text{ litres}$$

224 litres are needed to fill the tank.